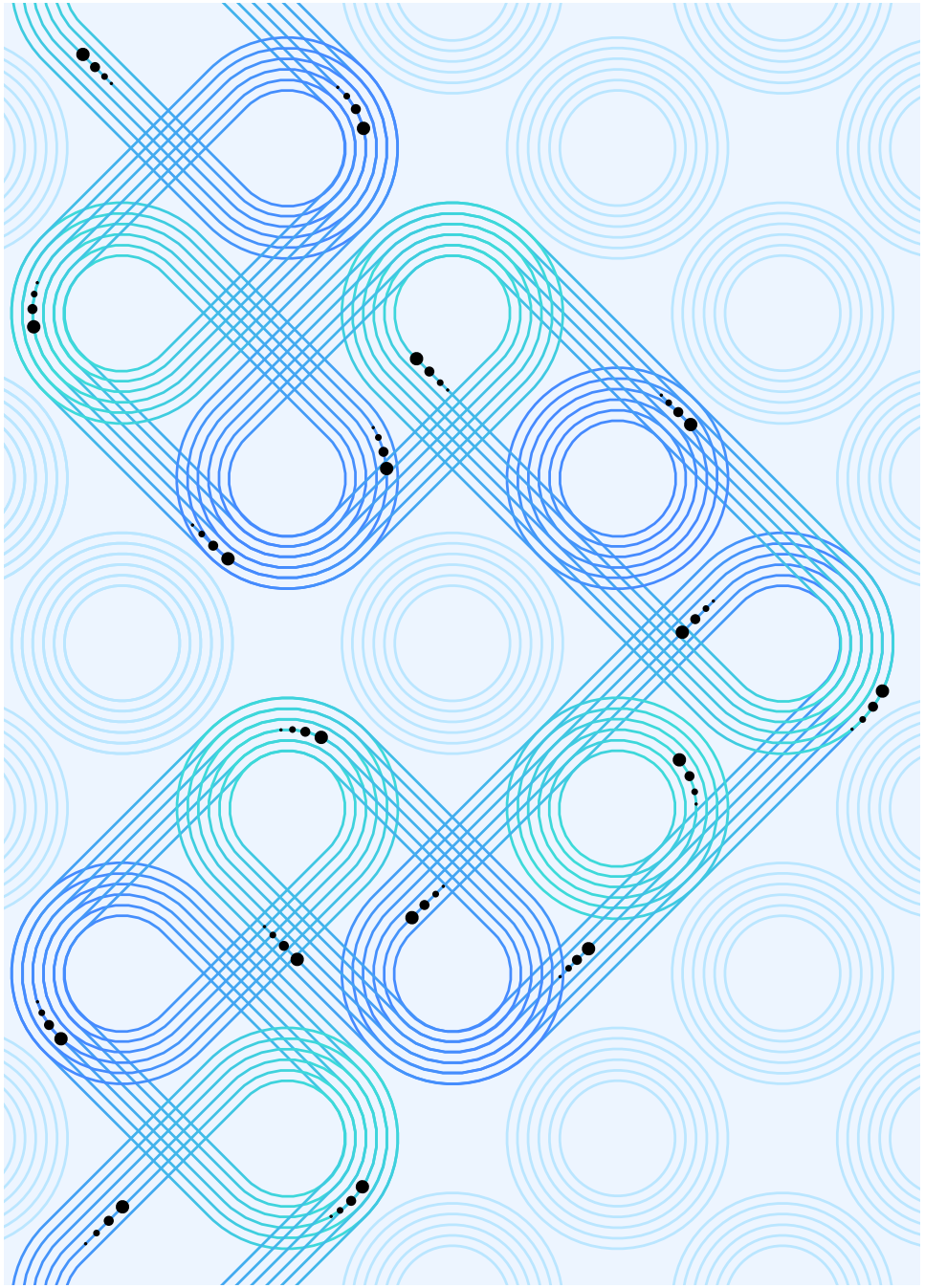
Scaling supply chain resilience with AI

Agentic AI for autonomous operations



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How IBM can help

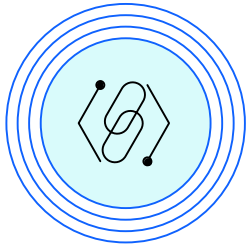
IBM has been providing expertise to help organizations win in the marketplace for more than a century. Clients can realize the potential of AI, analytics, and data using IBM's deep industry, functional, and technical expertise; enterprise-grade technology solutions; and science-based research innovations. For more information about AI services from IBM Consulting, visit ibm.com/services/artificial-intelligence

How Accelalpha can help

Accelalpha implements, integrates, and manages Oracle Cloud Applications. We help solve business problems with supply chain and logistics processes, procurement, customers' buying experience, and enterprise-wide financial planning and reporting. We provide change management to streamline business processes such as order to cash, procure to pay, and financial consolidation and close. For more information, visit accelalpha.com.

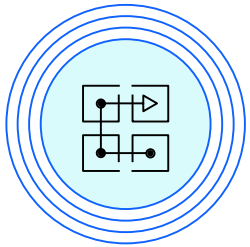
Key takeaways

Agentic AI is supercharging supply chain automation, accelerating process efficiency faster than humanly possible, and taking growth to the next level.



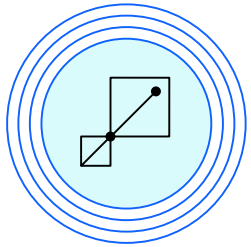
AI-enabled supply chains drive value.

Organizations with higher AI investment in supply chain operations report revenue growth 61% greater than their peers.



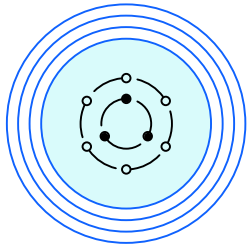
Executives see agentic AI as a business accelerator.

62% of supply chain leaders recognize that AI agents embedded into operational workflows accelerate speed to action, hastening decision-making, recommendations, and communications.



AI automation is happening faster than you think.

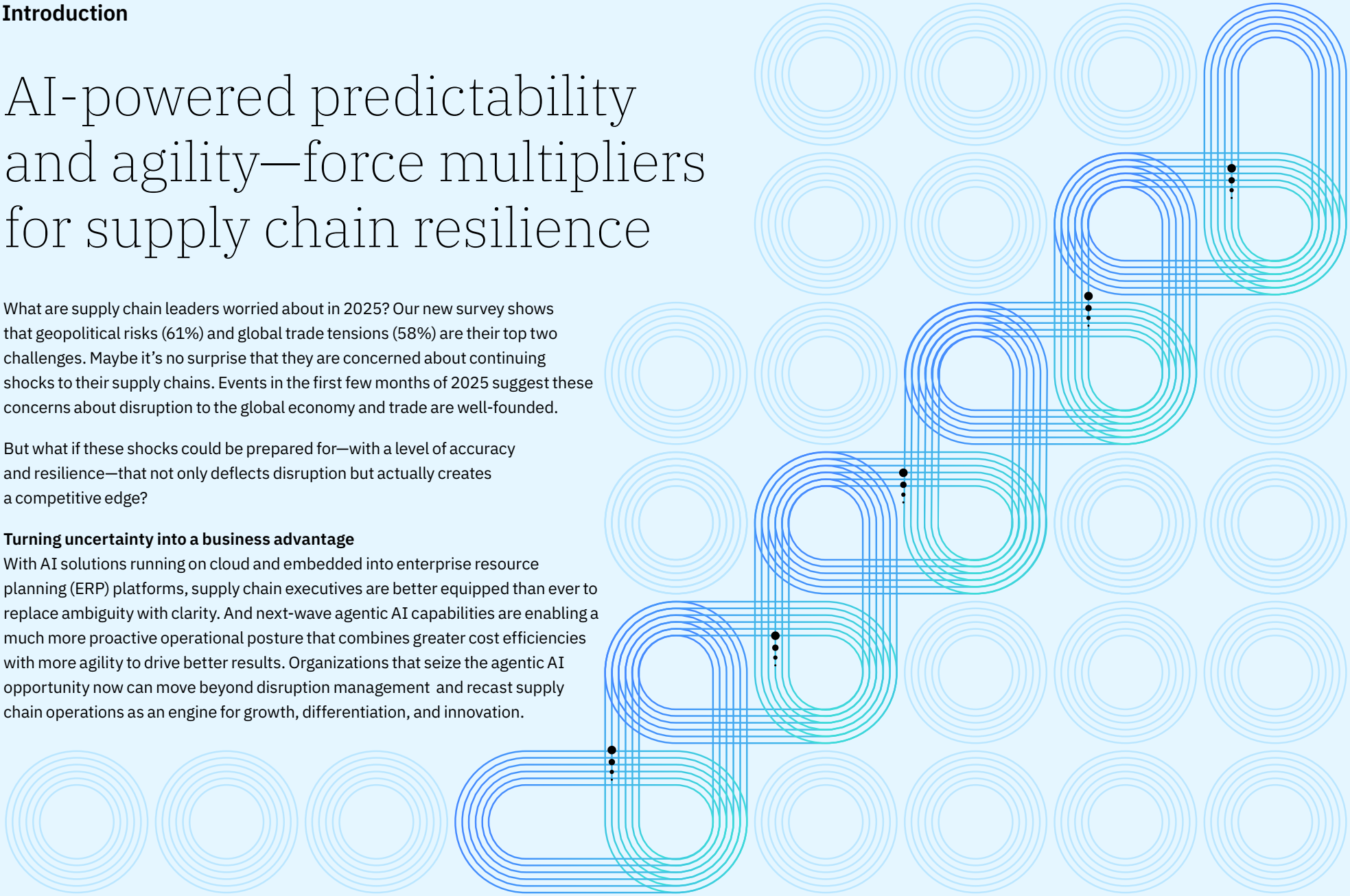
70% of executives state that by 2026, their employees will be able to drill deeper into analytics to support real-time analysis and optimization as AI agents automate operational processes, especially in procurement and dynamic sourcing.



Process efficiency gets an AI boost.

76% of CSCOs say their overall process efficiency will be improved by AI agents that perform repetitive, impact-based tasks at a faster pace than people can.

AI-powered predictability and agility—force multipliers for supply chain resilience



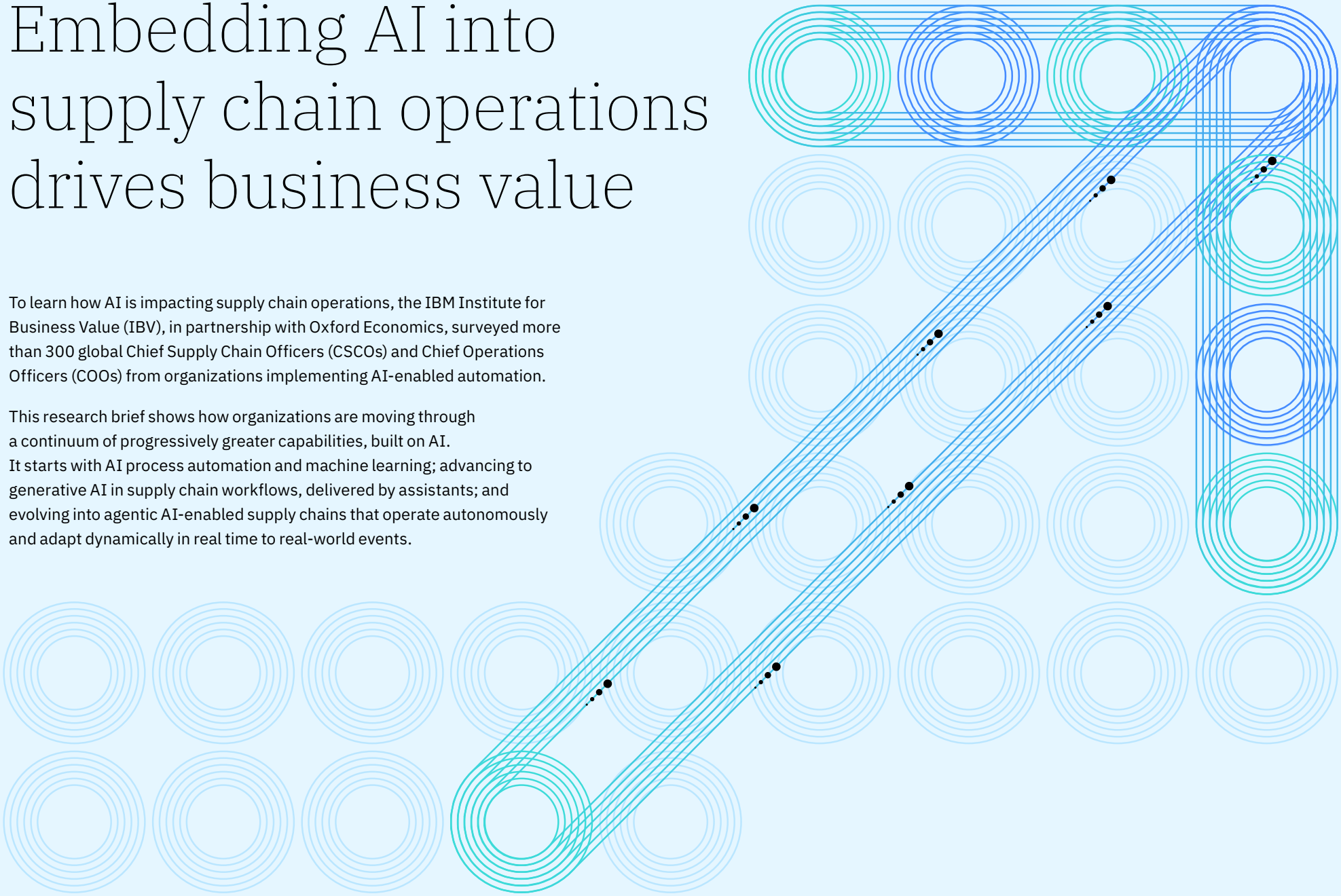
What are supply chain leaders worried about in 2025? Our new survey shows that geopolitical risks (61%) and global trade tensions (58%) are their top two challenges. Maybe it's no surprise that they are concerned about continuing shocks to their supply chains. Events in the first few months of 2025 suggest these concerns about disruption to the global economy and trade are well-founded.

But what if these shocks could be prepared for—with a level of accuracy and resilience—that not only deflects disruption but actually creates a competitive edge?

Turning uncertainty into a business advantage

With AI solutions running on cloud and embedded into enterprise resource planning (ERP) platforms, supply chain executives are better equipped than ever to replace ambiguity with clarity. And next-wave agentic AI capabilities are enabling a much more proactive operational posture that combines greater cost efficiencies with more agility to drive better results. Organizations that seize the agentic AI opportunity now can move beyond disruption management and recast supply chain operations as an engine for growth, differentiation, and innovation.

Embedding AI into supply chain operations drives business value



To learn how AI is impacting supply chain operations, the IBM Institute for Business Value (IBV), in partnership with Oxford Economics, surveyed more than 300 global Chief Supply Chain Officers (CSCOs) and Chief Operations Officers (COOs) from organizations implementing AI-enabled automation.

This research brief shows how organizations are moving through a continuum of progressively greater capabilities, built on AI. It starts with AI process automation and machine learning; advancing to generative AI in supply chain workflows, delivered by assistants; and evolving into agentic AI-enabled supply chains that operate autonomously and adapt dynamically in real time to real-world events.

As supply chain operations optimize workflows, automate processes, and support greater collaboration between AI tools and supply chain professionals, the flywheel of innovation begins to spin faster—infusing new ideas, streamlining business operations and reinventing processes to enhance customer, partner, and employee experiences while harnessing new revenue and supply chain performance opportunities. In fact, organizations with higher investment in AI for supply chain operations achieve a 61% revenue growth premium over their peers.

Over half of supply chain leaders (53%) are enabling autonomous automation of intelligent workflows via self-sufficient AI agents.

Perspective

From AI assistants to agentic AI: The evolution of AI-powered autonomy

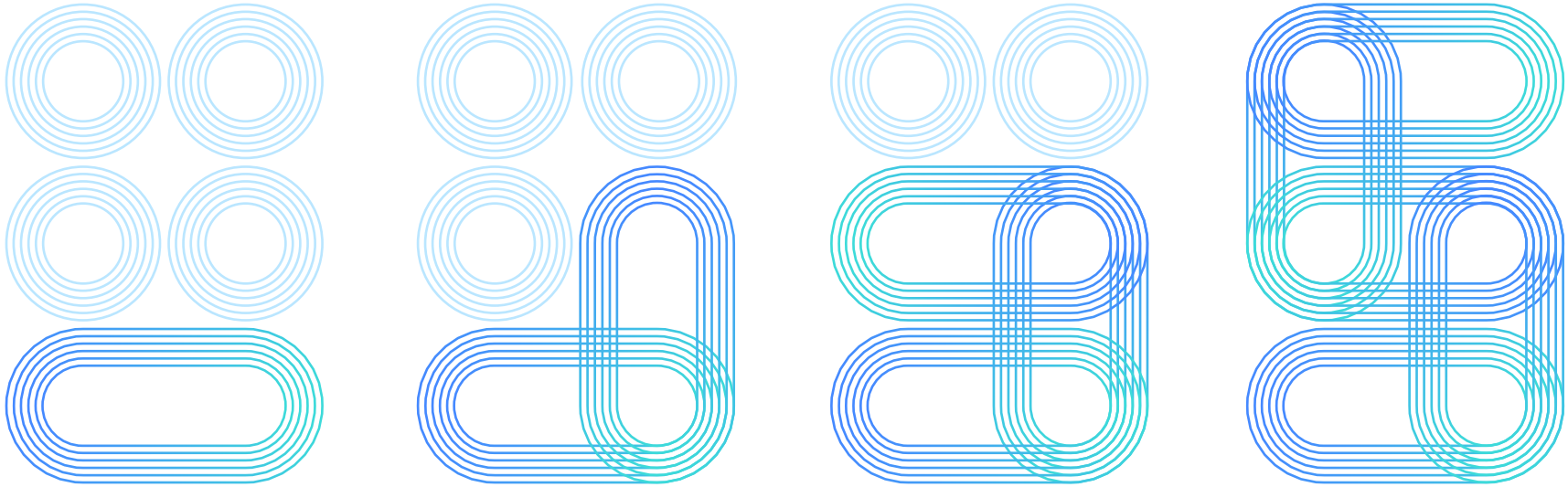
AI journeys begin with rules-based systems, enabling robotic process automation (RPA) to handle repetitive tasks and AI assistants to respond to queries. Assistants are making their mark on business productivity—especially in customer service, coding, and content creation—but their query-based frameworks limit contributions to workflow automation and autonomy.

Agentic AI breaks through these limitations by working proactively and autonomously to execute complex, multistep processes. At the core of agentic AI are large language models and fit-for-purpose small language models. For supply chains, small language models might be specific to integrated planning, global trade management, supplier contract negotiation, or dynamic logistics. Pairing autonomy with action, agentic AI restructures and optimizes workflows, eliminates unnecessary steps, and accelerates decision-making to unparalleled levels (see Figure 1).

Supply chain leaders are deploying agentic AI rapidly to attain these benefits. Currently, 53% of supply chain executives are enabling autonomous automation of intelligent workflows via self-sufficient AI agents, with 22% developing their proof of concept and 31% already executing and scaling proofs of concept.

Figure 1

AI benefits supply chain operations at various levels of maturity, but agentic AI has transformative potential



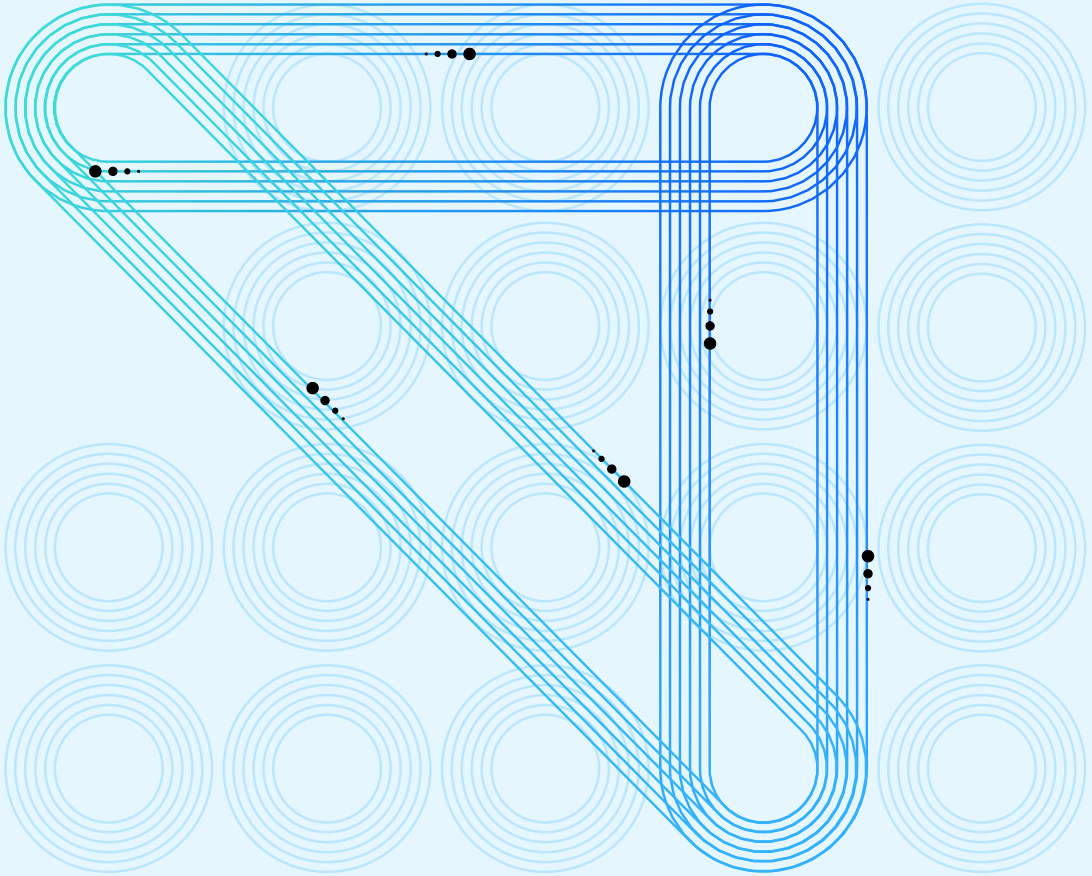
	Basic automation	AI-enabled automation	Interconnected and intelligent workflows	Agentic AI and autonomy
Type of impact	Automate high-volume, repetitive tasks.	Augment workforce capabilities.	Scale expertise and reach with AI assistants.	Orchestrate and execute workflows autonomously.
Supply chain example	Integrate order processing, invoice matching, and shipping notifications.	Predictively monitor equipment performance to prevent breakdowns.	Integrate workflows with AI assistants to give real-time, personalized responses to transactional inquiries.	Use AI agents to analyze market conditions and sales & operations data to adjust product prices in real time.

AI assistants: Lynchpins of intelligent supply chain operations

For smarter and faster decision-making, supply chains must tap into vast amounts of disconnected data. Historically, this has been a significant challenge. But now, critical insights from operational data can be surfaced rapidly—and more easily than ever—when the capabilities of employees are enhanced by AI-powered digital assistants.

Synergy between people and AI touches virtually every supply chain link, from planning and sourcing to manufacturing and distribution. In fact, 70% of CSCOs say gen AI has enhanced their responsiveness and communications with customers. And 55% of organizations say gen AI validates and aggregates information reliably for employees. That figure rises to 69% for organizations making higher AI investments in supply chain operations.

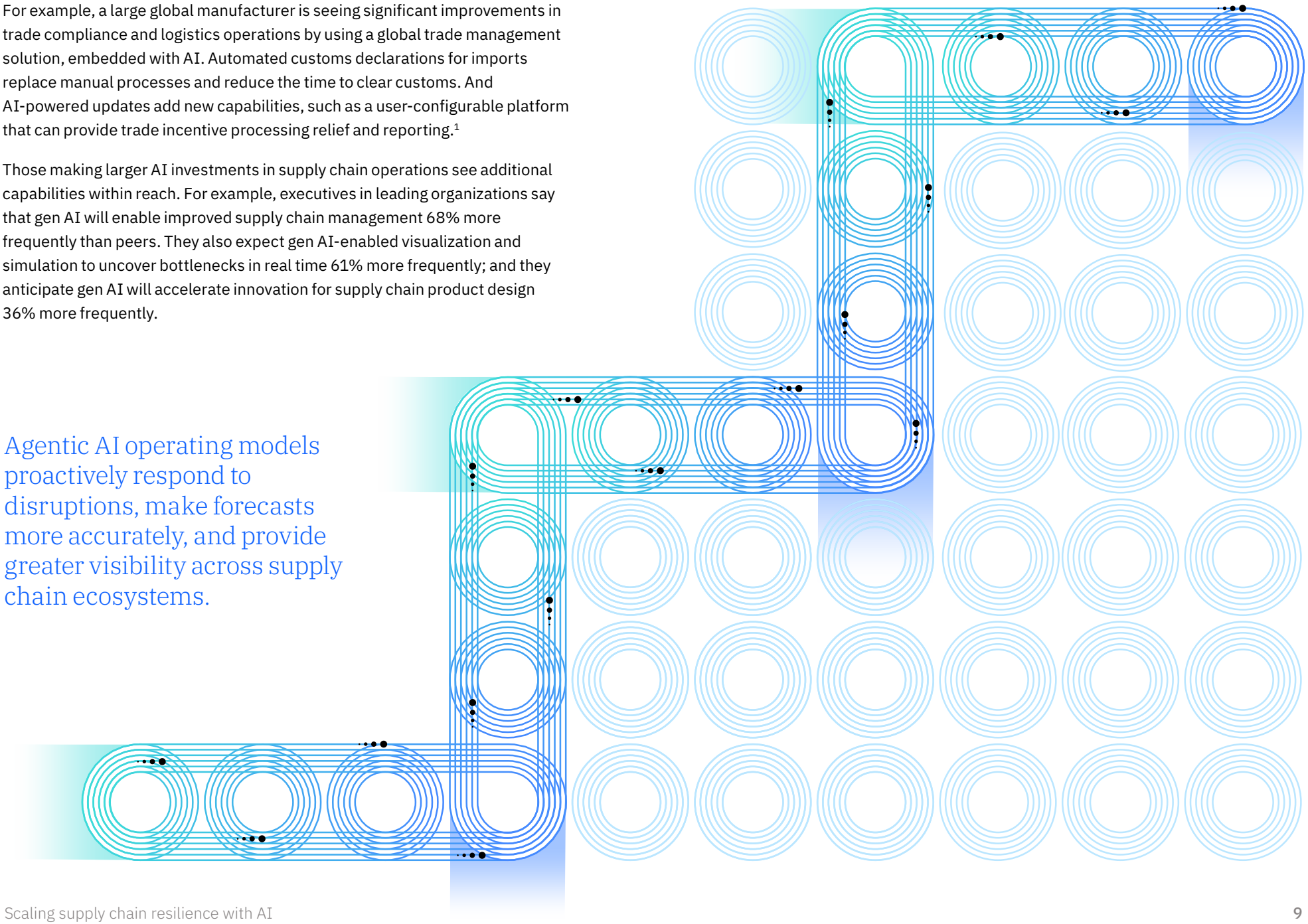
As executives experiment with and optimize gen AI's application in supply chain operations, they find that some areas benefit more than others. Today, they report that operational performance (67%) is the top benefit from investing in gen AI, while predictability and responsiveness to operational disruptions (60%) ranks second.



For example, a large global manufacturer is seeing significant improvements in trade compliance and logistics operations by using a global trade management solution, embedded with AI. Automated customs declarations for imports replace manual processes and reduce the time to clear customs. And AI-powered updates add new capabilities, such as a user-configurable platform that can provide trade incentive processing relief and reporting.[1]

Those making larger AI investments in supply chain operations see additional capabilities within reach. For example, executives in leading organizations say that gen AI will enable improved supply chain management 68% more frequently than peers. They also expect gen AI-enabled visualization and simulation to uncover bottlenecks in real time 61% more frequently; and they anticipate gen AI will accelerate innovation for supply chain product design 36% more frequently.

Agentic AI operating models proactively respond to disruptions, make forecasts more accurately, and provide greater visibility across supply chain ecosystems.



Building autonomous advantage: The agentic AI operating model for supply chains

Whether it is disruption to global trade, climate-related events, geopolitical conflict, inflation or systemic complexity, supply chain executives are accountable for finding workarounds. 74% of these leaders say gen AI enables better visibility, insights, and decision-making across ecosystems. To go further, these leaders are turning to agentic AIsolutions to act autonomously on those insights to help make operations more agile, adaptive, and resilient.

Now, for the first time, maturity in agentic AI technology enables supply chain organizations to build a comprehensive agentic AI operating model (see Figure 2). Configured to meet the dynamic, data-driven, and complex requirements of supply chain operations, this model represents a new way for supply chain leaders to achieve operational resilience, not only inside their own organizations but across entire partner ecosystems.

The reason agentic AI operating model capabilities extend beyond AI automation and assistance is fundamental—these models are powered by much more data from many more sources. Agentic AI models start with operational data from ERP applications and fit-for-purpose supply chain apps. They also include agent-to-agent interfaces with ecosystem partners and tap into external data sources, such as weather reports, market indexes, and geopolitical events.

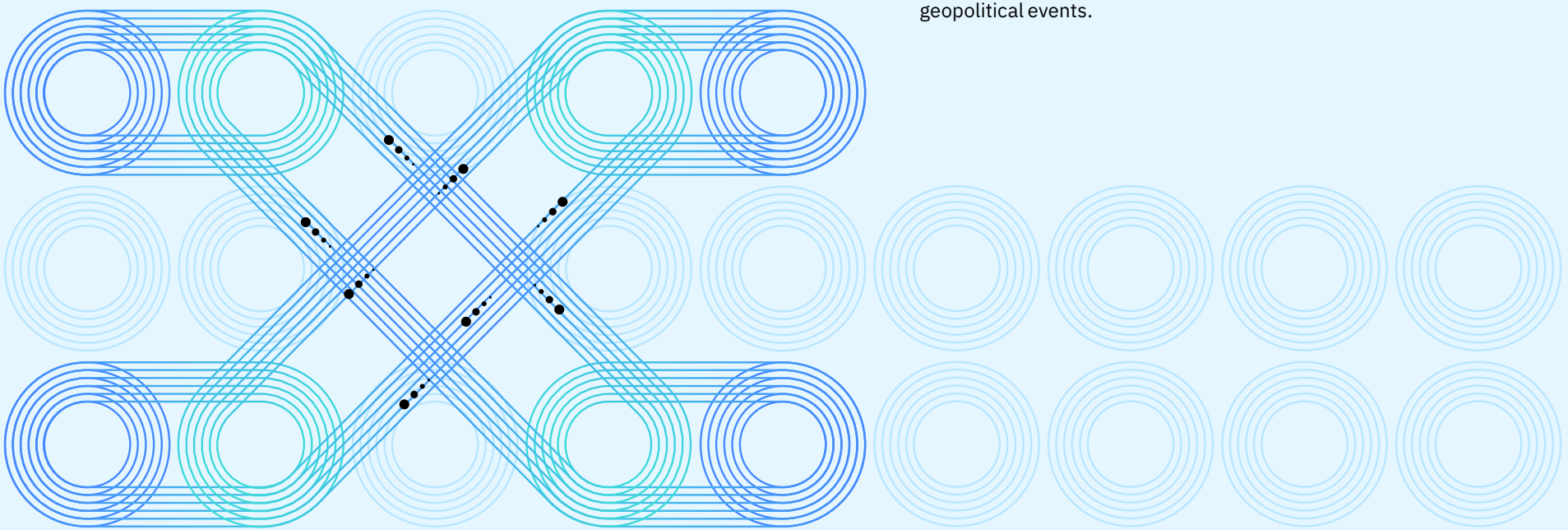


Figure 2

Agentic AI supply chain operating model

Supply chain and enterprise applications

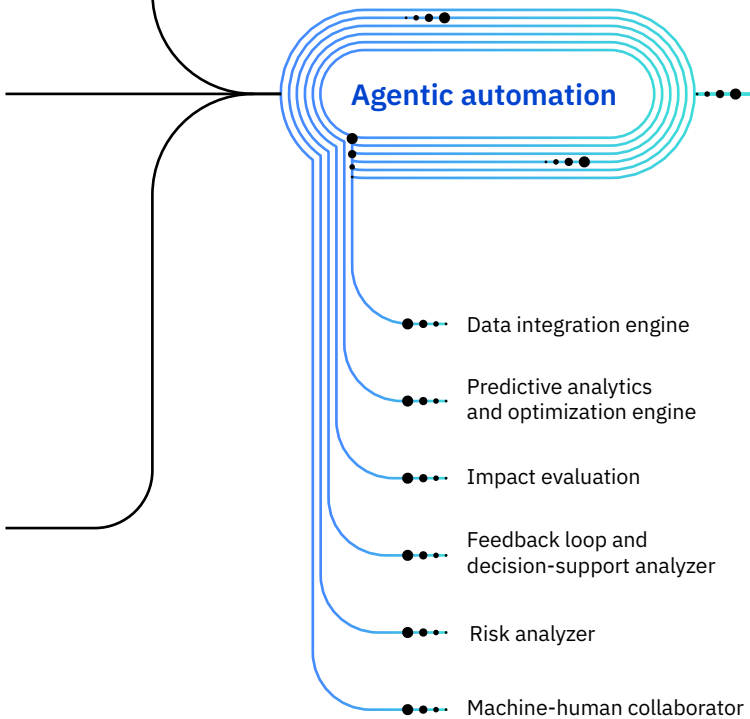
ERP. CRM. Integrated planning. SLM fit-for purpose models. Legacy systems, Enterprise and ecosystem APIs.

Ecosystem partner systems

ERP. Transportation management system (TMS), Warehouse management system, (WMS) Inventory management.

External data

Sensors: Manufacturing, transportation, environmental, security, weather, economic indices, market trends, geopolitical events.



Integrated planning

Predictive demand and supply planning–analyzing external factors and current conditions.

Global. Enterprise wide + Ecosystem partner's systems. Agent to agent.

Procurement optimization

Dynamic sourcing in real-time based on changing market conditions, demand, supplier capacity.

Supplier risk mitigation analysis and strategies.

Inventory optimization

Automatic replenishment actions across all inventory types and SKUs with sensor and location tracking.

Inventory balancing based upon real-time variabilities.

Production optimization

Intelligent yield prediction with variable analysis of resources, assets and environment factors.

Raw material and finished goods plant and fulfillment allocation.

Logistics optimization

Transportation optimization with dynamic re-routing based on traffic, weather, and customer segmentation.

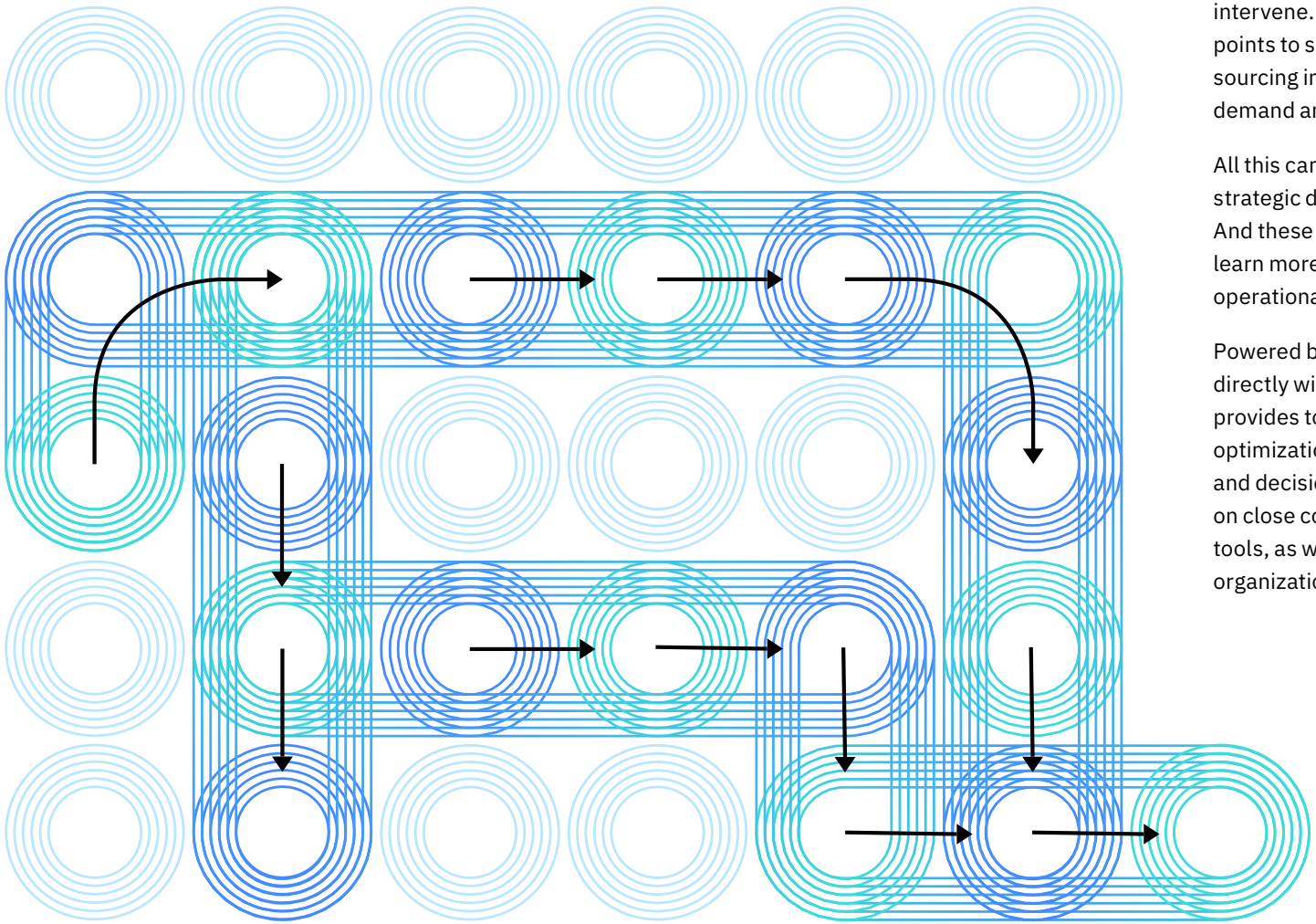
Robotics and automated guided vehicles for distribution activities.

Customer and field service automation

24/7 customer and field services responsiveness with personalized customer experiences.

Aggregated customer feedback analysis from multiple channels.

Agentic AI operating models proactively respond to disruptions, make forecasts more accurately, and provide greater visibility across supply chain ecosystems.



For example, autonomous agents working within the agentic AI operating model can perform core supply chain assignments such as adapting to changing market conditions, rerouting shipments, negotiating with suppliers, and mitigating risks in real time—all without depending on people to make decisions or manually intervene. Initial analysis into agentic AI deployment points to strong usage on tasks related to dynamic sourcing in procurement workflows, based on market demand and supplier capability.

All this can free up more time for people to work on strategic development and customer relationships. And these examples are just a start as organizations learn more about what agentic AI can do in their operational environments.

Powered by a data integration engine and interacting directly with supply chain systems, agentic automation provides tools for predictive analytics, workflow optimization, impact evaluation, risk analysis, and decision support. Agentic automation also relies on close collaboration between people and their digital tools, as well as among team members working across organizations and partner ecosystems.

In a supply chain environment, an agentic AI operating model analyzes current conditions and external factors integrating demand prediction and supply planning. The model optimizes procurement through real-time dynamic sourcing, based on changing market conditions, and optimizes inventory across SKUs with sensor and location tracking. And when it comes to optimizing production, an agentic AI operating model predicts yields while analyzing resources, assets, and environmental factors.

In the logistics space, the agentic AI operating model optimizes transportation with dynamic rerouting based on traffic and weather conditions and customer segments. And for customer and field service automation, the model aggregates customer feedback and responds with personalized customer experiences.

One of the key attributes of an agentic AI operating model for supply chains is its flexibility. These frameworks can be seamlessly integrated with existing analytics tools, such as inventory and transportation management systems, potentially making an immediate impact on overall supply chain performance.

By 2026, 57% of executives expect agentic AI will make proactive recommendations based on what it learns, and 62% expect AI agents will make supply chain process automation and workflow reinvention efforts more effective. Additionally, 76% of CSCOs say their overall process efficiency will be improved by agents that perform repetitive, impact-based tasks faster than humans can.

Employees working with agentic AI will be more involved than ever to help ensure safe, responsible, and accurate supply chain operations. And for this involvement to be successful, each employee must be held accountable and be deeply involved in orchestrating agentic AI outcomes. As AI agents are woven tighter into supply chain workflows, their level of autonomy should be closely monitored by people and adjusted as needed.

As supply chains seek differentiated outcomes from agentic AI, they'll need to balance innovation, speed, and governance to drive greater consistency in the value captured by improved workflows. Understanding how the model can deliver value starts with real-time visualization of an agentic AI operating model across all dimensions.

Visualizing operations begins with looking at how data flows into a platform—typically through an ERP system—with a geospatial, informational, and an orchestration analyzer. Next, agentic AI-enabled virtual models simulate how specific events could impact supply chain operations. Agents evaluate different scenarios and model potential problems that might result—such as global trade imbalances, cost spikes, and material shortages—and generate plans to mitigate disruptions.

With perspectives provided by proactive simulations, supply chain leaders can pivot quickly to make better decisions, capitalize on emerging opportunities, and share insights quickly across supplier ecosystems to scale innovation (see Figure 3).

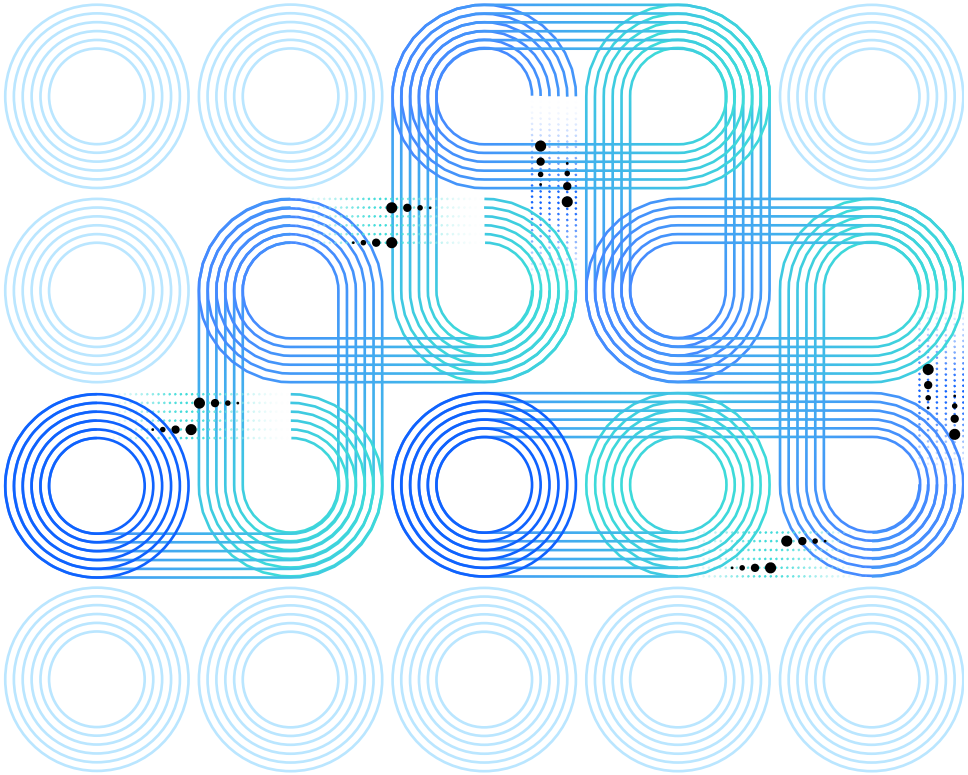
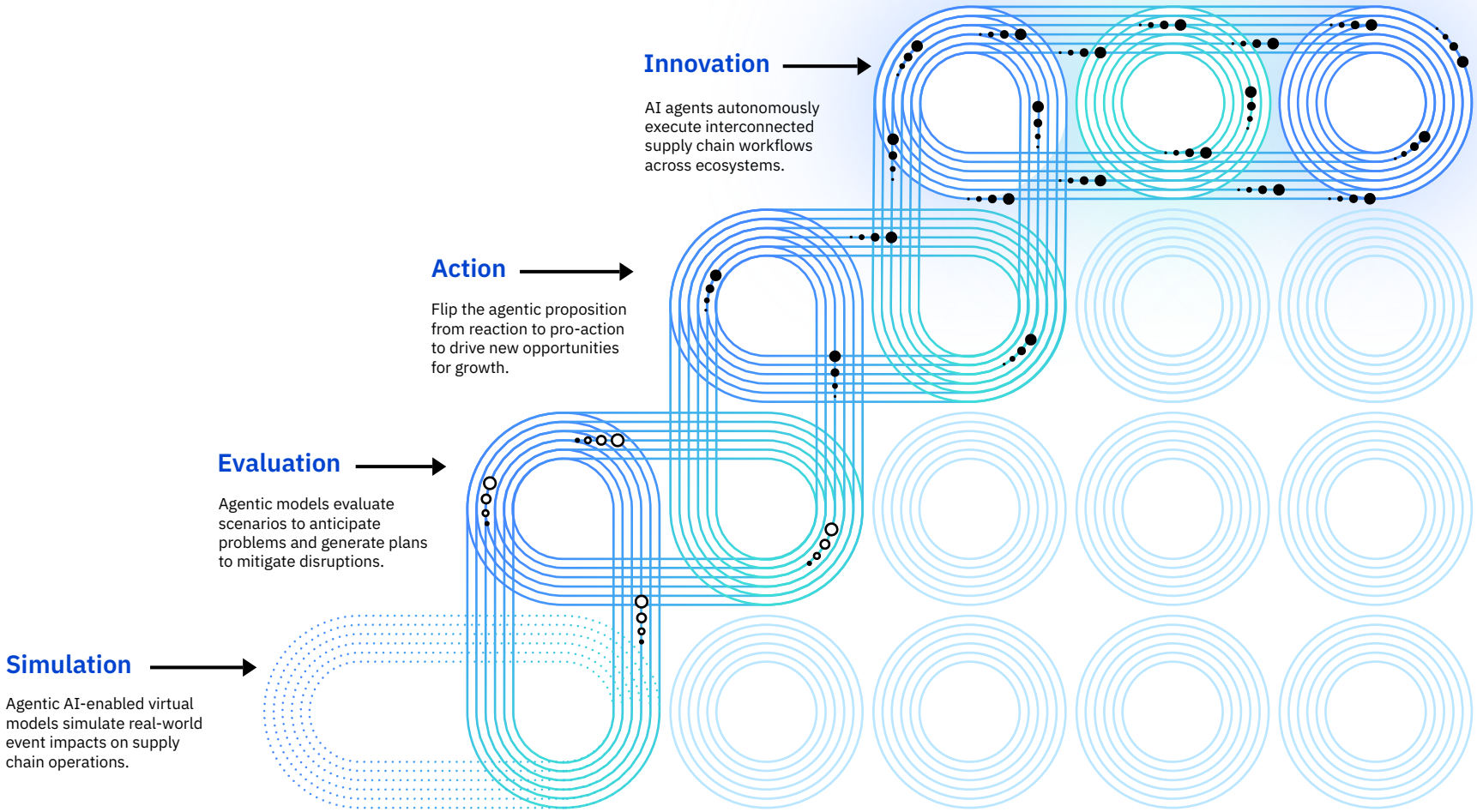
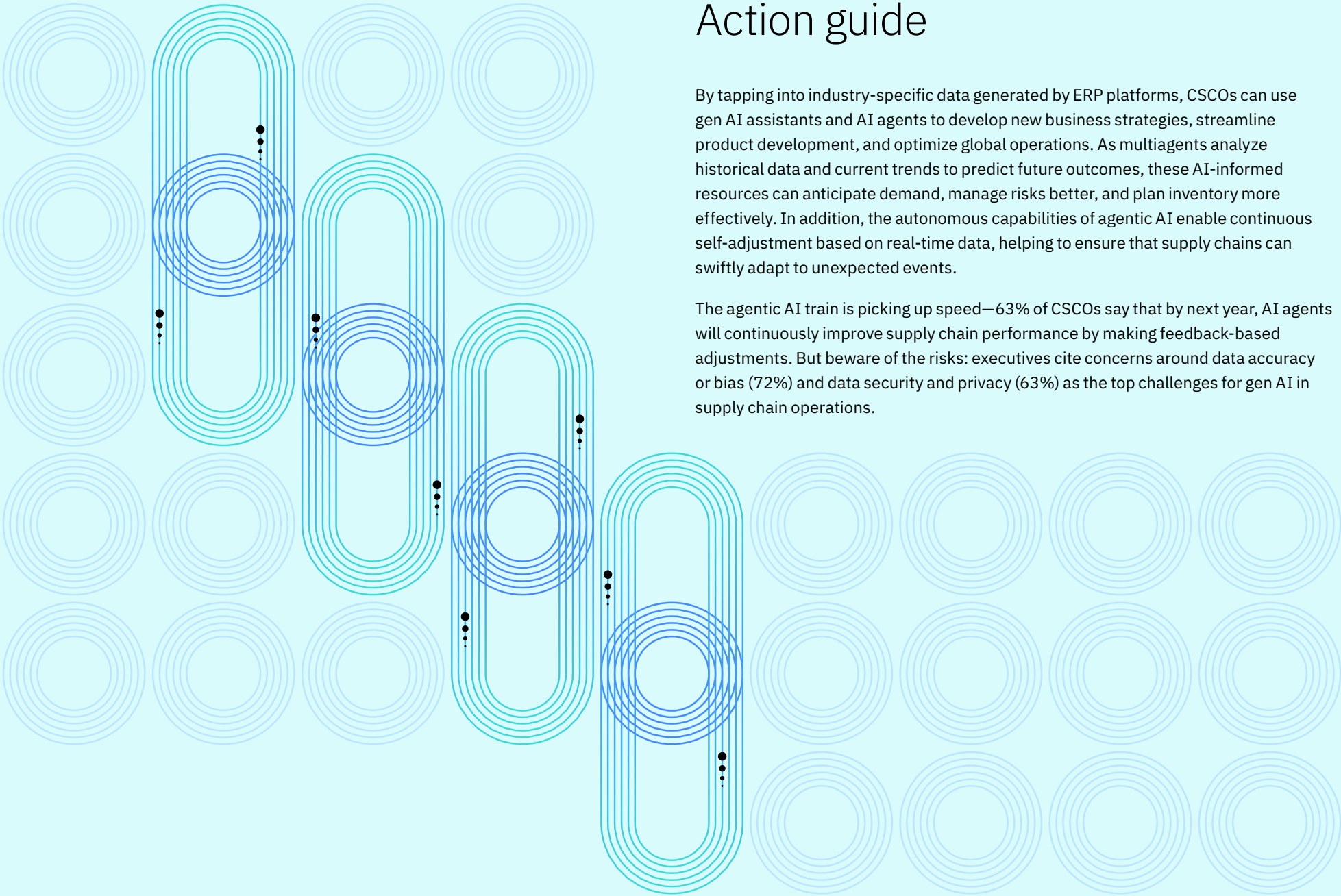


Figure 3

Agentic AI accelerates innovation


Innovation
AI agents autonomously execute interconnected supply chain workflows across ecosystems.
Action
Flip the agentic proposition from reaction to pro-action to drive new opportunities for growth.
Evaluation
Agentic models evaluate scenarios to anticipate problems and generate plans to mitigate disruptions.
Simulation
Agentic AI-enabled virtual models simulate real-world event impacts on supply chain operations.



Action guide

By tapping into industry-specific data generated by ERP platforms, CSCOs can use gen AI assistants and AI agents to develop new business strategies, streamline product development, and optimize global operations. As multiagents analyze historical data and current trends to predict future outcomes, these AI-informed resources can anticipate demand, manage risks better, and plan inventory more effectively. In addition, the autonomous capabilities of agentic AI enable continuous self-adjustment based on real-time data, helping to ensure that supply chains can swiftly adapt to unexpected events.

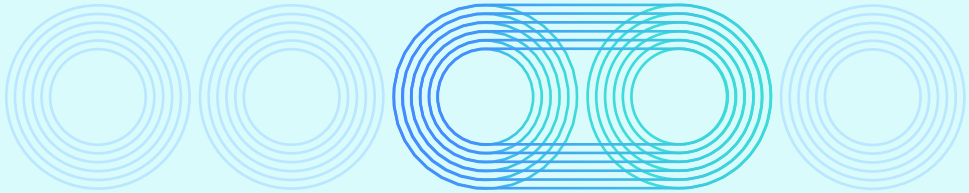
The agentic AI train is picking up speed—63% of CSCOs say that by next year, AI agents will continuously improve supply chain performance by making feedback-based adjustments. But beware of the risks: executives cite concerns around data accuracy or bias (72%) and data security and privacy (63%) as the top challenges for gen AI in supply chain operations.

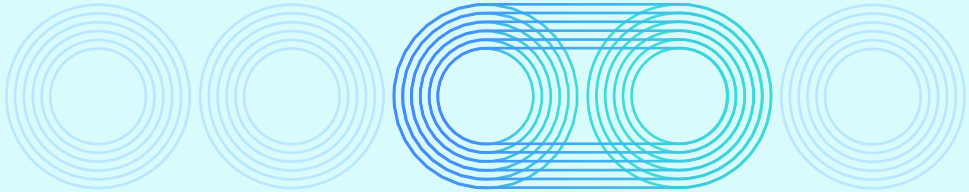
Get serious about developing an agentic AI operating model for your supply chain.

- **Evaluate current operations to find out where agentic AI can bring the most value.** Identify your challenges with data, workforce re-skilling and governance models. Clearly articulate the business impact you aim to achieve and develop KPIs and other measurements to track progress against your goals.
- **Assemble a diverse team including data scientists, supply chain experts, IT professionals, and other departmental leaders.** Make them responsible for designing and implementing your agentic AI operating model. Start small with proofs of concept, track progress, and scale quickly to deploy agentic AI solutions across your supply chain.
- **Focus on autonomy, granularity, network resilience, intelligent interfaces, transparency, and collaboration.** Integrate ethics into the AI operating model to support supply chain practices that are fair, transparent, and socially responsible, and build brand reputation and trust with customers and stakeholders.

Empower supply chain operations with agentic AI.

- **Establish KPIs for your AI agents and assign your people to monitor their performance.** Empower your people to set workflow optimization goals for AI agents, based on business impact. Also, put your people in charge of continuously evaluating how well AI agents are meeting preassigned business goals. Leverage objectively successful agentic AI applications as a blueprint for further innovation in supply chain activities.
- **Deploy agents throughout your ecosystem to amplify impact and reduce cost.** Implement AI agent operating tasks across the spectrum of supply chain workflows—especially those represented by your global partners. Map how your AI agents will work together to optimize existing workflows, create new workflows, and extend partner communications—all in real time. Engage with ecosystem partners to mutually assess and support each other in pursuit of agentic AI capabilities that go beyond the walls of your own enterprise.
- **Task agents to transform data from roadblock to accelerator.** Use AI agents to explore, create, and test hypothetical what-if scenarios derived from extensive proprietary data and organizational experience. Empower agents to autonomously orchestrate actions required to prepare for the most impactful and likely scenarios. Develop mechanisms to measure the value of agentic-led disruption avoidance to set a benchmark for continuous agent improvement.





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Karen is responsible for market insights, trends, and leading-edge thought leadership development. She is frequently invited to speak at international conferences and is widely quoted in leading business and industry publications. Her passion is to bring insights, strategies, and improvement agendas to clients to speed their AI digital transformation journey.

Research methodology

The IBM IBV, in partnership with Oxford Economics, surveyed 309 global Chief Supply Chain Officers (CSCOs) and Chief Operations Officers (COOs) from organizations implementing AI-enabled automation. The survey was conducted in February 2025 and evenly distributed across ten industries including automotive, communications, consumer products, financial services, government, healthcare/life sciences, logistics, manufacturing, retail, and technology.

The IBM IBV ran a series of contrast analyses, including pairwise comparisons, highlighting results and differences as shown in this report. Statistical significance for all pairwise comparison contrasts was set at the ($p = .05$) level, meaning there is only a 5% chance that the observed differences or relationships between the groups are due to random variation.

Notes and sources

1 "Transforming Logistics and Warehouse Operations for an Industrial Manufacturer." Client success story. Accelalpha. Accessed March 24, 2025. https://www.accelalpha.com/resource-center/transforming-logistics-operations-industrial-manufacturer/

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